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ABSTRACT

This issue--an international overview of cooperative/work experience education--contains ten case studies and four student viewpoints. It begins with an article discussing types of cooperative/work experience programs, including those focused on in the case studies. A second article previews the Second World Conference on Cooperative Education. These case studies are then provided: (1) Australian Cooperative/Sandwich Education; (2) cooperative education in Brazil; (3) industrial training period at the Universite de Technologie de Compiegne, France; (4) Berufsakademie Baden-Wurttemberg, Federal Republic of Germany; (5) Practice School, Birla Institute of Technology, India; (6) sandwich education at Ulster Polytechnic, Northern Ireland; (7) Teaching Company, Ulster Polytechnic, Northern Ireland; (8) cooperative education models in the Netherlands; (9) sandwich courses at Trent Polytechnic, Great Britain; and (10) cooperative education in the United States. The four Northwestern University students' perspectives concern management intern experience, "Northwestern in England" program, engineering experience in Wales, and employer's view of cooperative education. Administration of cooperative education at Northwestern is also considered in three articles. An annotated listing of associations and organizations active in cooperative education and a select bibliography are appended.
(YLB)

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CIHED NEWSLETTER

April, 1981

VOLUME 4, NO. 2

Special Issue Published

in connection with the

SECOND WORLD CONFERENCE ON COOPERATIVE EDUCATION

Northeastern University

April 22 - 24, 1981

COOPERATIVE OR WORK EXPERIENCE EDUCATION:

AN INTERNATIONAL OVERVIEW

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
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CIHED NEWSLETTER

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SPECIAL ISSUE

Volume 4, No. 2

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CO-OPERATIVE/WORK EXPERIENCE EDUCATION: TYPES OF PROGRAMS

Solveig M. Turner
Editor

Worldwide Educational Trends

There are now clearly discernible worldwide trends in education. Spurred by a network of international and regional agencies and organizations, such as UNESCO, OECD, SEAMEO, RIHED, CSUCA, the attention of individual educational systems is focussed in a common direction through conferences, studies, and reports. The larger cycles of worldwide educational interest span approximately a decade.

Thus, in the 1960s most educational systems were concerned with expansion, the opening of access to education to increasing numbers of young people and to previously disregarded groups, such as women and minorities, the handicapped. In the 1970s, it became evident that the expansion had become too costly; traditional formal educational programs -- especially in the developing world -- were not able to satisfy the enormous demands for education from a rapidly increasing youth population and one with rising educational expectations. As numbers increased in primary education this level no longer satisfied the students and demands for secondary and tertiary education grew proportionately.

As a result, the 1970s was a period of looking for alternative educational programs: adult education, nonformal education, recurrent and lifelong education were promoted worldwide. These were patterns of education that were able to move the burden of educating the population from the heavily impacted traditional institutions to more flexible settings. Experiments with different types of programs also became common: short-cycle institutions such as the Norwegian and Irish regional colleges and the French IUTs were encouraged, expansion took place in junior colleges in the U.S. and elsewhere, and distance education programs -- imitations of the vastly successful British Open University -- were started in countries as diverse as Spain, Pakistan, Thailand and Venezuela.

For the 1980s: Work Experience Education

One of the major trends in education for the 1980s is now emerging: the linkage between education and work. A number of conferences and reports, starting approximately in 1977/78, have pointed to this area as one in need of attention. A few examples:

1. The CEPES Symposium on Relations between Education, Research, and Production in Higher Education in Europe (June 26-28, 1979) stressed the imperative of establishing "measures ... to ensure better implementation of the policy of integration of education, research and production" as well as "the integration of students into the world of work."

2. The First World-Wide Conference on Sandwich/Cooperative Education at Brunel University (May 21-24, 1979) discussed the practical aspects of the work-education linkage.
3. The meeting of OECD's Education Committee in Paris (October 19-20, 1978) also concentrated its deliberations on "education and working life."
4. The Fourth Regional Conference of Ministers of Education and Those Responsible for Economic Planning in Asia and Oceania (July 24 - August 1, 1978) selected as two of its major themes the "Interlinking of Education and Productive Work" and "The Reform of Education Closely Linked to Economic, Social and Cultural Development."
5. The same theme was discussed at the Fourth Regional Conference of the Ministers of Education and Those Responsible for Economic Planning in the Arab States (organized by UNESCO in cooperation with the Arab League Education, Cultural and Scientific Organization) convened in Abu Dhabi in November 1977.

Similarly, a steady stream of reports and studies have investigated the topic. A principal study is Combining Education and Work, outlining work experiences in Asia and Oceania. Other examples can be found in the Bibliography at the end of the Newsletter.

It is thus clear, that the Second World Conference on Cooperative Education, which will discuss world experience as an educational tool for manpower production, has an urgent and timely message. Yet, this new stress on the linking of education and work seems to imply that such a cooperation is something newly invented although it was the accepted mode of learning through the last century. Traditional education and apprenticeships had utilized practical work as the major educational tool since the dawn of civilization. As Dr. Thomas Stoelinga states in his article on the Netherlands, even as a part of formal education, practical work experience has existed for about a hundred years.

Due to the extensive variation worldwide in the types and the extent of work experience in educational institutions it is all but impossible to get a complete picture of what is available and where. A further problem is the variation in nomenclature: internship, professional practice program, practicum, field service, experiential education, practice school, sandwich program, education en alternance, kombinations-utbildning are some of the terms used, which makes comparisons tenuous at best.

In 1975, Mosbacker reported in The International Encyclopedia of Higher Education (p. 1074) that 55 countries required some form of work experience in some of their programs. The World-Wide Inventory of Non-Traditional Post-Secondary Educational Institutions in 1980 recorded institutions in 43 countries that required practical work for graduation, and an informal survey at CIHED in 1978 using a more inclusive formula for defining work experience education, indicated that the number of countries offering a combination of work and study at some level in their educational

system (secondary/tertiary) was at least 100. CIHED identified four types of work experience programs: practical work as a 1) degree requirement, 2) licensing requirement, 3) pre-admission requirement, 4) repayment for a free education.

Practical Work as a Degree Requirement includes programs such as co-operative education in the U.S. and Canada, sandwich programs in the Commonwealth countries, Practice School in India. The work periods can be short-term or long-term, alternating or fixed in time, but most are expected to relate to the student's field of study. The ten cases included in the Newsletter as well as the following discussion treat work experience education as a degree requirement, however, it is of value to note that practical work relates to education also in other ways.

Practical Work as a Licensing Requirement generally exists in professional fields such as engineering, medicine, law, education. Thus, in most countries graduates are required to spend periods ranging from four months to two years working in their field of expertise prior to taking licensing examinations which will give them full participation as professionals in their own right. Examples are the work periods required of lawyers and secondary school teachers in the Federal Republic of Germany; the four-month practice required of Swedish engineers, etc.

Practical Work as a Pre-Admission Requirement. Some countries, such as Malta, Tanzania (and China prior to the return to admissions examinations in 1978) require that applicants to the university work a year or two prior to admission to prove that a national investment in their education is justified; in certain professional fields in Finland (kindergarten teaching, engineering) and other countries, students prove through a successful work period that they have the interest, the ability and the tenacity for the field of study. All the new mature-age admissions schemes in countries such as Canada, Australia, and Sweden's new admissions regulations, also focus on practical work for admission.

Practical Work as Repayment for Education. Programs such as the national service schemes in Nigeria, Ethiopia and the study service in Nepal are efforts to use scarce expertise for national development while recouping some of the cost for providing a free education. Romania places students in needed production for a three-year period on graduation and countries such as Algeria, Jordan, and Saudi Arabia require graduates to work for the government on graduation, often for as many years as training received. Graduates of the French Grandes Ecoles likewise agree to service for the government for a stipulated period in return for their education.

Degree-Requirement Programs

The Newsletter includes ten case studies of co-operative education programs. Due to short notice, descriptions of certain other programs did not arrive on time and several East European, South American, and Asian programs thus could not be included. For a number of very interesting programs, however, consult the World-Wide Inventory of Non-Traditional Post-Secondary Educational Institutions.

Certain aspects of the co-operative education programs stand out:

1. The majority of programs are fairly recent;
2. Most are implemented in short-cycle institutions, technical colleges or other non-university institutions;
3. Most are in professional programs, in engineering and sciences.

Few programs exist in general universities outside of the U.S. and Canada. Most technological universities: in the U.K., Germany, France, Iraq, Poland, Saudi Arabia to name a few countries, include a work experience in their engineering programs. Often as brief as four months and generally focusing on a graduation project, the work experience is mainly required during the final year of study.

In technical colleges, work experience programs are quite common. The professional colleges in the Netherlands described in Dr. Stoeltinga's report, the German Fachhochschulen and most polytechnics (in the U.K., India, Portugal, Venezuela, etc.) and technical colleges in countries as different as Australia, Ireland, Kenya, Malaysia, Pakistan, Singapore, Switzerland, Syria, and Togo report work experience of varying duration.

In the new short-cycle institutions work experience education is even more prevalent: the Berufsakademie in Germany, the IUTs in France, the regional technical colleges in Ireland and Norway, the YTH-programs in Sweden are but a few examples. New health programs for secondary school graduates in Austria (Berufsorientierte Weiterbildung für Maturanten); short-cycle higher technical studies in Romania, abridged study programs in Hungary and professional training programs in Nigeria, Ghana, Lesotho and many other countries include work experience periods of varying duration.

Dr. James Wilson reports in the U.S. article that major growth of work-experience programs has occurred in junior colleges. This, obviously, is a world-wide trend.

One disturbing factor to note in this regard is that most of the work-experience programs are in technical institutions and female enrollments in these institutions often are low. This would seem to indicate that women are remaining outside a growing and important new area of career training.

What is Needed for Success?

The case studies and the UNESCO study clearly demonstrate that co-operative education still is a nontraditional form of education. However, the case studies also demonstrate that perseverance in promoting the concept leads to great success. What then are the ingredients for a successful program?

All the authors seem to agree on one major fact: a total commitment to the philosophy on the part of the institution or the government agency promoting work experience education. The commitment has to be institutionwide and equally accepted by faculty, students and administrators. Policies regarding the rights and duties of each group have to be clear and concise and questions, such as remuneration for faculty, settled prior to initiation of the program. The institutions reporting the greatest success: Northeastern, Trent, Swinburne Berufsakademie, all report that they actually worked to sell the program to their constituencies: students, faculty and industry.

A second major ingredient that emerges from the case studies is the need for close cooperation with the employers at all levels: in formulating policies, drawing up curricula, and sometimes even using industry representatives as part-time teachers. To secure the right response from industry, the institution must take into account the needs and concerns of industry. It is clear that the slow growth of the Brazilian co-operative education programs, for instance, can be attributed to the lack of industry and faculty input in formulating and implementing the programs, while the German Berufsakademie is an excellent example of industry-government cooperation.

All of the articles report similar effects of the work-study programs on their students: an increase in maturity, in work motivation, in understanding of the demands of the world of work. They also indicate that the effects on faculty are similar in all countries: a greater concern for the needs of industry, for innovation and for linking theory and practice (no longer an ivory tower philosophy as Cecil Bulter stated in the U.K. article).

Industry, in turn, finds co-operative education a convenient recruitment tool and, through close contacts with the universities, is able to share training problems and new technological developments for mutual benefit.

The case studies all seem to agree, however, that educational change need not be fifty years in the making, but that it requires clearcut goals, and dedication to take root.

THE SECOND WORLD CONFERENCE ON COOPERATIVE EDUCATION
A STRATEGY FOR THE DEVELOPMENT OF
HUMAN AND ECONOMIC RESOURCES
APRIL 23 AND 24, 1981

The Second World Conference on Cooperative Education will be held at the Sheraton-Boston Hotel on April 23 and 24, 1981 in conjunction with the annual meeting of the U.S. Cooperative Education Association (CEA). The meetings of the CEA, the principal professional society of cooperative education in North America, will be held April 21 and 22, 1981.

The First World Conference on Cooperative Education held at Brunel University in the United Kingdom May 21-24, 1979 focussed on developments in work-experience programs throughout the world. The theme for the Second World Conference is the development and utilization of human and economic resources especially in nations of the developing world.

An underutilization of large numbers of young people as productive members of society exists in the face of worldwide shortages of technological and managerial personnel. Although the reasons for these dislocations are varied and complex, one fact is certain: There is a pressing need for changes in the way education, training, and employment are related. Extending the learning process by incorporating productive work experience into the curriculum is one promising solution and the theme on which the Conference will focus. Conference participants will examine the issues underlying the development and effective use of human resources and attempt to propose workable strategies for resolving these international concerns.

Thus, the Conference will address the following issues:

- The impediments to achieving employment mobility and meeting manpower needs.
- The changes required in the perceptions and practices of industry, labor, government, and education to enable both developing and developed economies to achieve high levels of employment and meet their manpower requirements.
- The design of workable and acceptable strategies for enhancing the employment mobility of people and meeting the human resource needs of society.

The Conference will open with a global overview of these issues. The overview presentations will be followed by major concurrent sessions focussing on the special concerns of industry, labor, government, and education. Small workshops will review program designs and implementation concepts. Concurrent sessions and regional groups will be utilized to organize appropriate plans for

the regions involved. The Conference will conclude with a synthesis of earlier discussions and a review of the proposals.

The Conference proceedings will be published.

For further information contact: Paul Dubé, Executive Director
World Conference Committee
Northeastern University, 503 ST
360 Huntington Avenue
Boston, MA 02115 U.S.A.

AUSTRALIAN CO-OPERATIVE SANDWICH EDUCATION

Robert S. Davie
Assistant Director
Swinburne Institute of Technology
Hawthorn, Victoria, Australia

Co-operative education, while still constituting only a small part of Australian higher education, now has a strong standing in several major institutions. From the first co-operative programs in the early 1960s, when two programs, both in engineering, were offered, there has been a growth to over thirty in the fields of engineering, science, business, and art. The new programs have been mounted in a comparatively small number of institutes of technology, with no special financial support, but with encouragement from the Commonwealth Department of Education. This support has been restricted to the funding of research projects aiming at the development and evaluation of co-operative courses.

Development has taken place mainly in the major conurbations of Melbourne and Sydney, and in the major institutes of technology in those two cities. In Melbourne, Swinburne Institute of Technology, a pioneer in co-operative education in Australia, now offers eleven programs in the fields of engineering, science, and graphic design, and in general has discarded its conventional full-time programs in these areas. Similarly, The Royal Melbourne Institute of Technology, which has concentrated its efforts in the field of business, requires that all students undertake degrees in business through the co-operative format. The New South Wales Institute of Technology, a major institute in Sydney, provides co-operative programs in engineering and science; in the former, again, there are no conventional full-time offerings.

Prior to 1970, when the number of programs was limited, employers had little exposure to co-operative education and were largely unaware of its merits or of the advantages which could be gained from the employment of students and graduates who had studied under the co-operative plan. The rapid, although concentrated growth in the early 1970s was accomplished against a background of the need to educate employers in the meaning of co-operative education, and the advantages accruing to them from it. Gradually, employers have become better informed, have begun to take an active part, as advisers, in the mounting of new programs, and actively to seek students and graduates. At present, despite a doubling of the number of programs between 1974 and 1980, along with a consequential increase in the number of student placements, employers are unable to obtain all of the students sought by them. They have become convinced either by direct experience, or through knowledge of the experience of others, of the merits of graduates from co-operative programs, and of the advantages which come from employing students, undergoing work experience, as part of their team.

Conference papers, generated by staff at Swinburne, RMIT and NSWIT have also assisted in the publicizing of the benefits of co-operative education. In addition, a major joint research study undertaken by Swinburne and NSWIT, and funded by the Commonwealth Government, provided solid evidence of the growth in co-operative education up to 1975; provided guidelines for its further development, and supplied evidence of the favorable employer attitudes, not only in Australia but also in the United Kingdom and the United States of America.

Growth in existing programs is not now restricted to the number of places available, but rather to the number of students seeking entry. Despite publicity by the institutes, many students seeking to enter degree programs are still unaware of the value, or, in many cases, of the meaning, of co-operative education. There is an entrenched Australian view which sees the conventional full-time course as being the normal learning method. This view is gradually being dispelled. Many of the current students in co-operative programs have consciously chosen them because of a desire to obtain an education which integrates academic and work experience. The number of students is, however, still below that which can be accommodated whether in the teaching institutions or in work placement.

As it is substantially larger than any other institute in the state, the New South Wales Institute of Technology occupies a unique position, and from this position is able to command attention, publicity, and coordination for its co-operative programs. The Victorian institutes, while large in Australian terms, are not as prominent. However, fields in which they offer co-operative programs are complementary and they have seen the advantages of working together in the common cause. Several years ago, Swinburne founded the Cooperative Education Center to bring together Institute staff, students, and employers involved in its programs. The expansion of the Center to include the Royal Melbourne Institute of Technology and subsequently Footscray Institute of Technology, has ensured that the major institutions and programs in Victoria can work to a common purpose through the Center. Submissions to government, seminars for employers, preparation of guidelines for students and employers, and assistance to career advisors in the schools are all part of the continuing activities of the Center. The inclusion of the students, both in the membership of the Center and with representation on the Center Committee, was deliberately included in the Center's terms of reference; it has proved to be of substantial value.

Students and graduates are among the best ambassadors for co-operative education, whether it be formally as speakers at Center meetings, by excellence of performance in work placements and subsequent careers or, as their careers progress, directly as the employers of those who follow them. This growing reputation has led to an increasing geographical spread of placements. Co-operative students are associated with many of the major resource developments in remote areas of Australia, others are working in nearby countries such as New Zealand and in South East Asia, while still others are in Europe, many under a joint scheme between Swinburne and the University of Surrey in England.

Australian co-operative programs owe much to earlier development in the United Kingdom and the United States of America; they originated through knowledge of the successes in those countries. They have now developed characteristics of their own which have ensured that they are as relevant to Australian needs as are their progenitors to needs in their countries. The Australian programs, for instance, are structured with two major work periods of six months rather than several shorter periods as in the United States. Also contrary to U.S. practice, the teaching staff assume the responsibility for the placement of students in work assignments.

The First World Conference on Cooperative Education at Brunel University in May 1979 provided a British and European background to its discussions. The Second World Conference at Northeastern University in Boston in 1981 is expected to provide an American background to discussions. It is to be hoped that Australia, as a future Conference host, would also add its own particular flavor to the co-operative world scene.

CO-OPERATIVE EDUCATION IN BRAZIL

Heltor Gurgulino de Souza
Professor and Vice Chairman
Federal Council of Education
Brasília, Brazil

Although different forms of work experience programs have existed in Brazil for a long time, the first official program of Co-operative Education was not introduced until the First National Development Plan through Project 16 of the Sectorial Plan for Education and Culture during the period 1972-1974.

The implementation of the program was the responsibility of the then Department of University Affairs (DAU) which is now called the Secretariat for Higher Education of the Ministry of Education and Culture (SESU) in cooperation with the Instituto Euvaldo Lodi (IEL) and a group of federal universities in three states, São Paulo, Santa Catarina, and Paraíba.

Basically the program has been offered in the field of engineering and comprises a six-month work experience during the student's study period, usually during the second or the final year of study. Credit is awarded for successful work completion and reports on the student's success are required both from the students themselves and from their supervisors in industry. The program is further evaluated both at the local and national level.

Most of these programs started in 1972, and, although some have been successful, others have faced difficulties. Positive efforts to improve their success also have been made by the Center for Cooperation between Education and Industry (CIEE) in São Paulo and some other states as a result of initiatives taken either by the universities or the employers.

Many other government and private agencies are now involved in programs to promote cooperation between educational institutions and industry and we can mention, for instance, the work by the Conselho Federal de Mão-de-Obra (Federal Council for Manpower) which was created by Law number 6.297 of December 1975 and makes available substantial financial resources for manpower training by providing tax incentives for the enterprises that invest in manpower training programs.

In addition to co-operative education, there are a number of different work experience programs in Brazil: internships (during vacation periods or during the academic year), work-study programs (many Brazilian college students work during the day and study in the evenings), and others.

It is felt, for instance, that an internship (estágio) is a worthwhile intermediate phase between study and professional work on graduation because the student

has an opportunity to face the realities of work which will later facilitate his or her entry into professional practice. If well planned and guided the internship can be of advantage to the institution, the student, as well as the employer. Colleges are able to receive an immediate feedback from the students as to the weaknesses and strengths of their curricula. For the student, the internship not only represents a chance to receive professional training but also an opportunity to test his or her capacity to perform specific functions that previously have been mere textbook cases and to assess his/her program of study and the profession itself. For the employers, short or long-term internships are a means of becoming aware of new methodologies and technologies and sometimes assist in the solution of production problems. The internships also constitute an effective means for the selection and training of personnel.

Work experience programs are still in their infancy in Brazil as both institutions and employers struggle with a number of practical problems. At special seminars conducted by the Instituto Euvaldo Lodi and the Federal Council of Education, the following obstacles have been identified:

- There are often no formal signed agreements between the educational institution and the employer;
- There is an inadequate structure for the coordination of the training both in the colleges and in the enterprises which makes an evaluation difficult;
- There is a lack of interaction between the professors and the supervisors in industry;
- There is no agreement between the content of the internship activities and the real need of the employer;
- The teaching staff refuse to undertake student guidance because of low remuneration;
- The educational institutions are not well informed about the job market: the enterprises need technicians, the institutions are concerned with educating a "well-rounded" individual;
- Sometimes the enterprises are not informed about new technologies; at other times the curricula are outdated;
- Competition for training opportunities is strong in the cities and enterprises perceive the intern as "cheap labor";
- The student remuneration is not adequately resolved.

If some of the above problems can be ameliorated, there is a true possibility for growth in work experience education. Generally all three parties to the programs -- students, employers, institutions -- agree that the positive aspects of work experience outweigh the negative. Thus, despite a slow start, student numbers are slowly growing in these programs.

THE INDUSTRIAL TRAINING PERIOD AT THE UNIVERSITE DE TECHNOLOGIE DE COMPIEGNE

P. Gaillard and J. F. Chrétien
Université de Technologie de Compiègne

The Université de Technologie de Compiègne (The Technological University of Compiègne -- U.T.C.), established in 1972, offers five years of undergraduate curricula in bioengineering, chemical engineering, and mechanical engineering. The objective of the new institution was to find an alternative educational route between the Grandes Ecoles (Professional Schools) and the traditional university. Another aim was to improve the links between education and industry.

The education offered at the U.T.C. is not exactly a co-operative education program or a sandwich program, but during their five years of study, the students have three paid industrial training periods, one lasting one month and the other two lasting six months each. There are, of course, similar problems of organization and pedagogy in all three programs. The three work periods are compulsory for graduation with the Engineering diploma. It is possible for a student to undertake more than three work periods because of the flexibility of the study system in Compiègne, but each additional period of industrial training increases the duration of the study by one semester.

Two-Year General Introduction

In Compiègne, all students follow a common curriculum for the first two years of study, the so-called "Tronc Commun." The purpose of the introductory years is to give a common background in the basic sciences deemed necessary for an engineer. During the same time, the students are also introduced to engineering practice, by having to solve technological problems which are realistic and ill-defined, just as those met in actual life. Also, in order to develop an early contact between professional and academic life, all students are required to spend a four-week period in industry at the end of the first semester. This is credited as a regular course. The purpose is to give a first professional experience by actually giving the student a real task to complete. The first assignments vary widely, both as to type and subject, extending from unskilled worker positions to higher positions, depending on the prior training and experience of the student. They usually take place in assembly, machine tools or production shops, or in laboratories. At the end of this probation period, the student is required to write a short report which describes the appointed task, relates it to the industrial environment, and ends with personal considerations on the experience gained. The student also has to make an oral presentation to an audience of other students and faculty members. Furthermore, the engineer who was supervising the work period makes an evaluation of the student's ability to take initiative, to work in a team, and to integrate into a social group. The assignment is

credited or not on the basis of the evaluation of the students' report, the oral presentation, and the evaluation sheet. The assignment has to be credited in order for the student to graduate.

Specialization

After graduating from "Tronc Commun" and receiving the diplôme d'études universitaires de technologie (DEUTEC), the students may elect to specialize in any of the three above mentioned fields of engineering. The first industrial training period of six months takes place at the beginning of the fourth year. During this period, the student has a job as a higher technician, while during the second six months' period at the end of the curriculum the student generally is employed as an engineer.

Student Placement in the Work Environment

The placement of the students is carried out by a special department based on the students' previous curriculum and motivation. A university teacher and an industrial tutor jointly supervise the training program agreed upon. The teacher visits each student two or three times during the training period. At the end of both training periods, the students are required to write a technical report (50 pages) and have to make an oral presentation of 15 minutes in front of a teacher, an industrial tutor, and other students. The assignment is credited or not on the basis of the evaluation of the technical report, the oral presentation, and especially based on the judgement given by the industrial tutor and the employer. If the work period is not completed in a satisfactory manner, the jury does not validate it and the student must repeat it.

U.T.C. receives about 30% more requests from French companies than there are available students for placement. Annually, U.T.C. sends four hundred (400) students on these six-month diverse periods and two hundred (200) on the one-month training period to about five hundred training companies from all over the country. Compiègne is at the present time the only school of engineering in France which offers such a curriculum.

U.T.C. also sends its students to foreign countries (Sweden, Great Britain, Germany, Canada, etc.) and generally concludes an agreement with a University in the country to locate and supervise this training period. The purpose of the work abroad is to familiarize the student not only with foreign industry but also with the culture and the way of life of the country, as well as to gain fluency in the language. Of course, U.T.C. reciprocates by assisting students from these foreign universities with French placements.

Student Development

It has been found that the students are much more mature when they return from the work placement to the university for their last year. Some of them are

distinctly critical of the university's courses or laboratory equipment. They bring a discreet pressure on the teachers and invite them to continuously reexamine the program. They stimulate the thinking of the professors and , accordingly, contribute much to the development of the university. Some students are offered positions directly as a result of their success during the last work period.

Employer Reaction

The employers are very interested in U.T.C.'s work-study program as the duration of the training periods which are unusual in France allows the student to actually undertake useful work for the employer. They also appreciate that the students from U.T.C. are alternating work/study in the industry every six months, which allows the company to maintain a student worker year-round.

U.T.C. finds that the work periods are very important:

1. because of the links which are created between industry and university
2. because of the impact the students bring to bear on the courses after their work experience
3. because students actually complete valuable work for the employer during the long periods of work and also because of the new ideas that students may bring to their employers
4. because the work period allows the training of well-rounded graduates.

BERUFSAKADEMIE BADEN-WÜRTTEMBERG

Federal Republic of Germany

Established in 1974 by the State of Baden-Württemberg, the Berufsakademie (freely translated as Career Academy) provides a new type of career education that integrates theory and practice and is designed to fill a need for middle-level manpower. As structured it constitutes a third level of education alongside the universities and the Fachhochschulen (technical colleges). Although the technical colleges also incorporate a period of practical work experience during their program of study, the Berufsakademie is unique in its requirement that the students be employed throughout their full period of study. The new institution has received strong support both from the state and from the federal government and, as a result, in only six years has grown substantially from a modest beginning of 170 students employed by 50 different employers in 1974, to 2,700 students filling training places with 900 different employers in 1980.

There are now six Berufsakademien: in Stuttgart, Mannheim, Villingen-Schwenningen, Heidenheim, Ravensburg, Karlsruhe, and a branch to Mannheim at Mosbach. Discussion is underway regarding the possibility of opening similar institutions in other states.

The Berufsakademie offers three years of education to secondary school graduates (Abiturienten) in alternating periods of theoretical training in the academy and practical training with an employer. The student signs a contractual work agreement with the employer prior to entry into the Academy and is paid a salary throughout the full period of study whether attending the Academy or working.

Curricula are drawn up by subject commissions composed of representatives of the Academy, the Ministry, employers, and universities and technical colleges in order to ensure relevance of programs. The part-time teaching staff also are drawn from industry and other educational institutions. It is felt that the close cooperation with industry allows the Berufsakademie to respond rapidly to new curricular demands. This is, in fact, reflected in the Berufsakademie as most of the curricula underwent major revisions after the first three years. New trends in the industrial sector, such as computer technology and microprocessors, have been incorporated into the study programs, while new areas such as taxation reflect the need for an upgrading of job qualifications in many fields.

The fields of study are technology (electrotechnology and machine building with several subfields); business (with subfields such as insurance, taxes, tourism, computers, etc.); social work (handicapped, youth work, prison work, etc.). A first state examination after completion of two years of study allows the graduate to enter the work force at that point with a professional degree. For instance, in technology, the first qualification reached after two years of study (and a completed state examination) is engineering assistant. If the student selects

Table I

BERUFSAKADEMIE

Study/Training Option: Business Administration in Industry

Structure of Training and Coursework		Practical Training on the job	Courses at Studienakademie	Work-related Seminars within enterprise or at Studienakademie
		12 - 14 weeks per term	9 weeks per term	2 - 3 weeks per term
Basic Training/Education	1 st term	Materials Management Manufacturing Management	Courses (appr. 30 periods/week) in 1. General subjects: Economics, Management, Law, Data Processing, Statistics etc. 2. Business Administration and Industrial accounts incl. Cost-Accounting; contents synchronised with phases of practical training 3. Optional Subjects: e.g. languages	Seminars, case-studies, business games to apply theoretical knowledge to business problems courses in methods and techniques - planning and decision-making e.g. net-work analysis; - meetings, report-writing, presentation methods - creativity training, group relations evaluation of reports on practical work
	2 nd term	Marketing Management		
	3 rd term	Financial Management Management Accounting		
	4 th term	Personnel Management Organisation		
First stage qualification: Wirtschaftsassistent (BA)				
phase	5 th term	Specialised training in one of these functions - Marketing including Internat. Marketing - Financial Management, Accounting, Auditing - Personnel Management - Materials Management - EDP and Organisation	1. General subjects as above 2. Management of two enterprise functions according to students' study options	writing of thesis on work-related topic
	6 th term			

Second stage qualification: Betriebswirt (BA)

to continue an additional year, he or she will qualify for the title Engineer (Berufsakademie) after a second state examination.

The intermediate examination is considered especially important as it alleviates the problem of student wastage, i.e. students dropping out of the program prior to reaching a formal job qualification, which has been a serious problem in the German universities.

Every half-year block during the study period consists of 24 weeks with the division into a practical and theoretical part varying depending on the field of study. In business, students get nine weeks of theory and fifteen weeks of work in each block (see Table I for a fuller explanation of the business program); in engineering and social work, students study twelve weeks and then work twelve weeks. During the theoretical business study there are 25 class hours a week; during the practical work component 40 hours of work a week. The theoretical study is transmitted by means of lectures, practicums, and seminars.

The Programs Evaluated

Both the Ministry and independent evaluators have evaluated the Berufsakademie in a favorable light. Professor Mann reports, for instance, that

1. Graduates of the institution actually fill the types of positions for which they were trained;
2. In respect to their work integration and the rate they assume responsibility, employers rank Berufsakademie graduates higher than university graduates;
3. Graduates have favorable prospects for advancement into higher positions;
4. Graduates do not have to worry about unemployment.

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For additional information, contact: Berufsakademie--Staatlichen Studienakademie
Stuttgart
Postfach 240
Calwer Strasse 23
D-7000 Stuttgart 1
Federal Republic of Germany

PRACTICE SCHOOL: INDUSTRY-UNIVERSITY COLLABORATION
AT BIRLA INSTITUTE OF TECHNOLOGY, INDIA*

In 1973, the Birla Institute of Technology instituted the Practice School, a novel work-study program involving theoretical study at the Institute and practical work exposure at so-called Practice Stations. From one practice station in 1973 the program has grown to 60 practice stations located throughout India and from an enrollment of a mere twelve students supervised by three faculty to 700 students and 60 faculty in 1980.

The unique aspect of Birla's collaboration with industry is the establishment of the Practice School stations in factories, businesses, and government agencies. Referred to as host institutions, the agencies and businesses collaborating in the program offer the students varying facilities, ranging from classroom and library space to free accommodations for students and/or faculty, and allowances for the students.

The Practice School method of education is a controlled simulation or real life working conditions. During the period of study (four- and five-year bachelor's programs and master's degrees in all of the university's disciplines are offered in the Practice School program), the classroom is moved into a Practice Station for a total of seven and one half months; two months (PS-I) following the third year of study and five and one half months (PS-II) during the final year of study. At the Practice Stations, students and faculty drawn from different disciplines involve themselves in interdisciplinary, goal oriented problem solving efforts, concerned with production and design problems and planning and development. The major difference between the Practice School and other work-study programs, such as sandwich programs and co-operative education, is the requirement that faculty be present full-time to supervise the students' work at the Practice Station. On one hand the faculty fulfill the role of consultants to the teams of students on assignment; on the other hand, they shoulder the responsibility for supervising the day-to-day student performances in collaboration with representatives of the specific work site.

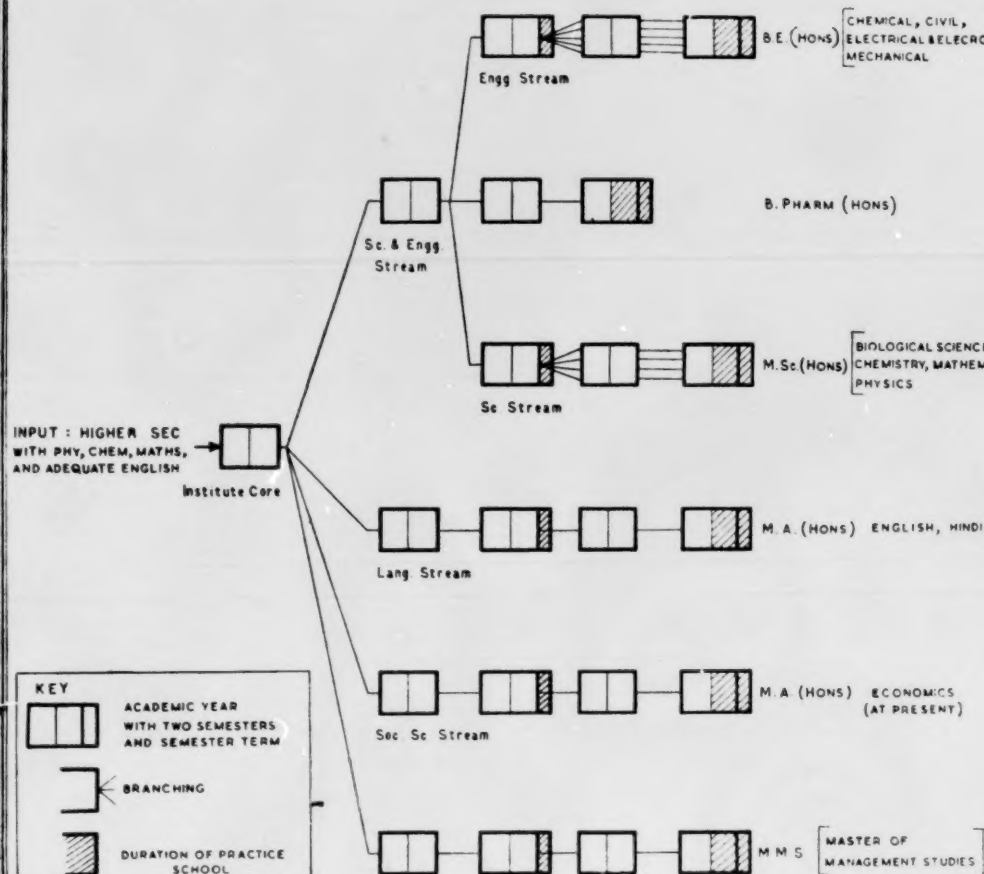
The entire first year of study consists of a broad-based core curriculum common to all students. The hallmark of the program throughout is its flexibility. Students can seek a transfer from the middle of one degree program into another without loss of standing; opportunities exist for double majors and other changes. The PS-I period generally is undertaken in large industrial complexes where the study is conducted through: study and design-oriented assignments; in-plant exposure; and visits to various departments. Through quizzes, group discussions, seminars, project reports, etc., the resident faculty continuously evaluate the students'

* The Editor gratefully acknowledges assistance from Dr. C. R. Mitra, Director, Birla Institute of Technology and Science, in the compilation of this description.

BIRLA INSTITUTE OF TECH. & SCIENCE PILANI (RAJ.)

5-YEAR INTEGRATED PROGRAMMES

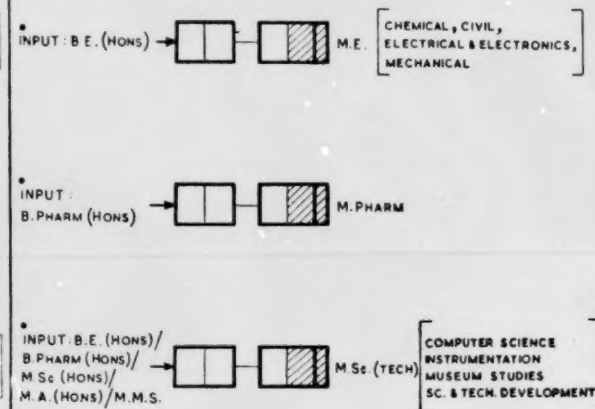
(WITH PRACTICE SCHOOL OR WITHOUT)



FLOW CHART

2-YEAR MASTER'S PROGRAMMES

(WITH PRACTICE SCHOOL OR WITHOUT)



THE INSTITUTE PROGRAMMES ARE DESIGNED ON THE EXPECTED INPUTS SHOWN HERE. BUT THE STRUCTURAL FLEXIBILITY CAN ACCOMMODATE BRILLIANT STUDENTS WITH THE FOLLOWING INPUTS :

- WITH ADVANCED STANDING - PROGRAMME DURATION REDUCED
- WITH REMEDIAL COURSE DEFICIENCIES - PROGRAMME DURATION EXTENDED BECAUSE OF ADDITIONAL MAKE-UP / PREPARATORY COURSES
- BY MID-COURSE TRANSFER FROM ONE PROGRAMME TO ANOTHER
- THROUGH SECOND SEMESTER ADMISSIONS
- DUAL PROGRAMME - A STUDENT CAN WORK CONCURRENTLY FOR TWO FIRST DEGREES

Note : From Summer 1980 onwards PS-I will accommodate B.Pharm. (Hons.) students after II Year.

Source: The Birla Vidya Vihar Bulletin, Vol. 23, No. 3, January 1980, p. 101.

progress, both in terms of problem solving and decision making and of personality development.

The PS-II section is attended by students in their final year of study. The students going into PS-II are divided into two groups; half attend the PS-II in the first semester; the other half during the second semester. The PS-II assignment generally is in production units or in design, development, or consulting agencies. Students are divided into teams of three to four and assigned problems identified by the host agency in collaboration with BITS faculty. Each group has a student leader who is responsible for the planning, scheduling, and implementation of the full task. Examples of work projects are : Design and Fabrication of Pneumatic Crust Breaker; Reorganization of an Electrical Distribution System.

After successful completion of both theoretical study and the PS requirements students are awarded a degree with the designation "with Practice School". Those students who complete Practice School have carried a greater academic and hourly load than students in traditional programs although BITS is attempting to equalize the extent of study time by utilizing summer vacations for the PS assignments.

The Practice School students have, as a rule, found great acceptance in the job market, which has, of course, stimulated the growth of the program within BITS.

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SANDWICH EDUCATION AT ULSTER POLYTECHNIC

James Patterson
Senior Lecturer, Faculty of Business
Ulster Polytechnic
Northern Ireland

The Ulster Polytechnic in Northern Ireland, celebrating its 10th anniversary this year, is now firmly established, and its advance since its foundation in 1971 has been rapid. There are presently some 4,450 full-time and sandwich* students (in programs ranging from Arts to Business Administration to Technology) and some 3,000 in various part-time programs, in high-level courses leading to national (and therefore international) qualifications, both academic and professional.

Sandwich courses are a feature of the Polytechnic's work and students entering these courses may be either industry-based, i.e. sponsored by a particular firm or Polytechnic based, that is, students receive grants and the Polytechnic assists in placing them in appropriate employment for the training period.

Students in Placement

The number of students enrolling for sandwich courses has expanded in line with the increased student population from a total enrollment in 1971/72 of 1,708 to the present number in excess of 7,450; this steady increase is directly related to the development of appropriate courses. Of the 4,450 full-time and sandwich students, 1,224 are on some form of attachment, although only three Faculties (Departments): Science, Technology, and Business and Management offer the industry-based thick sandwich courses (i.e. courses that include one full year of work experience. In contrast, thin sandwich courses provide a number of periods of work experience, ranging from two to six months, spread throughout the academic experience of the student). See Table I.

Although the majority of the industry-based students remain in Ireland, both North and South, where subsidiaries of multinationals have been most co-operative, some are placed in Great Britain, France, Germany, and Belgium, with one or two going to the U.S.A. This year one business student is completing his year in Saudi Arabia.

* The Sandwich program is one which alternates periods of full-time work off campus and full-time study at an educational institution as an integral program.

Table I

	Faculty			TOTAL
	Science	Technology	Business and Management	
One-year Sandwich course, Industry based	21	109	137	267
Other practical training, one year or more				22
Attachments (six months to one year). Other practical experience				296
One to six months				613
Language placement				<u>26</u>
	TOTAL STUDENT NUMBERS ON ATTACHMENT			1,224

Problems Encountered

By virtue of its unique position as the only Polytechnic in Northern Ireland, the Ulster Polytechnic has had to devote considerable resources to the promotion of co-operative education, both to schools and to likely employers, and although there are undoubtedly advantages of monopoly, there are also the disadvantages of being the only one banging this particular drum. It is hoped, therefore, that with the now well established National Institute of Higher Education in Limerick also offering sandwich courses, and with the imminent arrival of a similar institution in Dublin, co-operative education will become more widely known and accepted throughout Ireland. The very high level of unemployment in the province has certainly caused considerable difficulties in finding suitable employment for sandwich students, but so also has the lack of appreciation or lack of information about the educational and commercial benefits of these courses for businesses.

The courses have nevertheless been highly satisfactory and it is rare for employers not to repeat the experiment once they have been won over.

Student Attitudes

The practical orientation of these sandwich courses is very attractive to the potential students who realize the benefits to them upon graduation: of being

able to offer an academic qualification to a prospective employer as well as a work experience and, in most cases, also a major project completed during the year.

Returning to college on completion of placement, students are more mature, better motivated and able to draw upon not only their own experiences but also on those of their colleagues. They seem, however, better able to relate their final year's work to the experience gained than to relate first and second year work to the placement year.

International Placement

For the benefits it would undoubtedly bring both to the Polytechnic and to the students themselves, it is highly desirable to send as many as possible outside the province. There is no doubt that just as travel broadens the mind, so does international placement. These benefits are not only academic and practical, but also social, giving the student an appreciation of life outside this small area with a population of 1.6 million. Hopefully, they will return with new skills and new knowledge to the benefit of the community at large.

Areas of Growth

One of the major drawbacks of international placement is that all too often, there is little or no involvement by the host country's educational institutions. The student is given employment in a foreign country, but has no contact with its universities or other educational institutions. Although this may not necessarily be detrimental to the student, it would seem a pity that greater efforts are not made in most cases to foster close relationships between the institutions in the countries involved.

One method at present being developed in some newer courses, particularly where a foreign language is involved, is for the placement to be split between a period in an academic institution in the host country and a period of work experience in that country. There are a number of advantages in this type of exchange, the most notable being that it gives the students a period of acclimatization. It also ensures that they may be assessed for appropriate placement according to their individual needs and abilities and are available for interview on the spot by potential employers. Perhaps even more advantageous is the fact that it promotes increased interaction between these students and their foreign counterparts. In addition, this allows them to maintain contact with the academic staff, who when needed, together with other inter-institutional contacts, can assess each other's educational programs, recognizing the similarities and dissimilarities between them. The joint programs that develop from this would seem to be the best way to promote the growth of international co-operative education. It is also essential to ensure that comparability and compatibility between the various courses

offered and the aims and objectives of placement, are consistent.

Another possible development would be exchanges of students between various multinational corporations and their subsidiaries. United States' and continental companies with Irish subsidiaries could benefit if the students they have accepted for co-operative education could spend part of their training period in two locations, i.e. one part with the parent company and another with the subsidiary in another country.

The Teaching Company Scheme, initiated in 1975 by the Science Research Council and Department of Industry, is a two-year collaborative program between an academic institution and an engineering firm. Students selected to participate in such a program take part in six months of course work at the university and, after a successful assessment of their course work, are assigned to an industrial project for the remainder of their two-year appointment. In most of the schemes the students return to the university for one day each week for a supportive studies program, consisting of lectures, tutorials, seminars, case studies and laboratory exercises. Students also are required to discuss their work through the presentation of seminars regarding their individual projects. The qualification awarded is a Master of Science by Research.

THE TEACHING COMPANY

Robert I. Houston
Pro-Rector-Industrial Liaison
Ulster Polytechnic
Northern Ireland

Ulster Polytechnic is one of a growing number of institutions in the United Kingdom which operates Teaching Company Schemes. It is unique in that it is the only one to operate three entirely separate schemes concurrently. Its involvement represents a substantial commitment of staff time and energy, for Teaching Companies are not easy to run. On the basis of the results so far this institution is convinced of their value and would encourage still others to try. Although Teaching Companies have been born out of concern for Britain's poor economic performance they seem to have much to recommend them even if this were not the case.

Objectives

A Teaching Company is a scheme funded by the Science Research Council and the Department of Industry, working in conjunction with an academic institution and its industrial partners. The name is derived from a loose analogy with the concept of a Teaching Hospital where promising medical students work in hospitals under the supervision of experts. The scheme has been operating in a variety of forms since 1975. There are today some 40-50 operational companies under the control of a central directorate at the SRC.

The scheme has four principal objectives:

- to improve the viability and profitability of manufacturing industry;
- to attract well educated and equally highly motivated young graduates into manufacturing industry;
- to tackle real and important problems within those industries;
- to strengthen the links between industry and academia.

Thus Teaching Companies can be viewed as extensions of co-operative education.

The Need

For a long time, concern has been expressed over the increasing inability of British industry to compete in the world markets and the Teaching Company Scheme is an expression of this concern.

While it may be a symptom, rather than the disease, manufacturing industry has not been able to attract the brightest and best young graduates in Britain. The best of those attracted often quickly opt out for something other than manufacturing management.

The scheme attempts to reverse this trend by careful selection of young graduates (known as Associates) with good academic qualifications and personal qualities of an equally high order. Whether the possession of good academic qualifications is essential for success in the scheme is open to question. Certainly it is felt that the right personal qualities are equally, if not more, important but to date this has not been tested.

Roles of Participants

The scheme is administered, at a local level, by a joint team consisting of academics, industry representatives and a representative of the SRC. It is an equal partnership in every sense. Industry provides the work setting and the tasks, the latter being worked out in joint consultation with members of the academic staff.

The Associates are offered short-term contracts, about two years is the norm, at attractive salaries. They are promised challenging tasks and considerable responsibility. For them, the aim is to develop self confidence and become the managers of the future.

The seconding of bright young people to work on industrial problems, is, of itself, nothing new. But to work on problems of vital importance, frequently requiring urgent attention, is a significant deviation from custom. For it to

happen at all speaks volumes about the industrial partners and the academic staff selected to support the work. The essential requirement for both the manager and the academic staff is a trusting relationship built on the ability to perform. And because trust, so based, takes some time to build up, there must be a modest element of risk taking as well. Difficulties can and do arise; most are soluble and provide excellent learning opportunities.

The role of the academic institution is principally to support the Associate. It does this in a number of ways. It stands ready to supply expert inputs on demand. Its facilities, laboratories, libraries, and staff can be deployed swiftly should the program so require. To assist this, one or two members of staff are assigned to act as industrial supervisors to each Associate. Initially they are chosen because of their expert skills and they work closely with the Associate and their counterparts in industry. As the program progresses their role can change to that of facilitating access to the institution's resources. Joint monitoring of all work programs is supervised by the local management team.

Within this loose framework a variety of essentially different Teaching Companies exist. In some cases the work assigned to the Associate involves research and development at the present boundaries of advanced technology. In others, the tasks include a large element of shop floor work, supervision, and particularly in small firms that often are short of certain specific skills, management tasks.

Of the three teaching companies based in Ulster Polytechnic each is very different. One involves work in a medium sized firm, a world leader in its field, where Associates are involved in designing the new generation of products for the 80s and beyond. The others are principally concerned with new, small and often struggling firms, where the principal demands are made against personal qualities and organizing skills rather than high technology. Each requires a different approach not only from the Associates but from the academic staff who support them and upon whom so much depends. While the emphasis in all the schemes running in Britain is on engineering and engineering management, there are many who feel the scheme could profitably be broadened to include business graduates.

Costs and Benefits

The full costs of operating a Teaching Company Scheme is approximately [£]24,000 per Associate per year, which, considering all the possible benefits, is not excessive. One Associate, after working for four months on his first assignment, made recommendations which led to savings greater than the cost of all our three programs. This pattern of success, if less spectacular, has been repeated many times. The program with which we have most experience is that which involves small businesses. In these we can point to an impressive list of cost savings, increased productivity, increased quality performance, new product design and many others. There have been, of course, failures and difficult

times. After two years of operations it is possible to stand back and review; to make changes and suggest improvements. Three Associates have already completed their two-year terms. Each is now a Managing Director in his own right. None is yet thirty years old.

For further information contact: Teaching Company
Directorate
Science Research Council
P.O. Box 18
Swindon SN2 1ET
Great Britain

CO-OPERATIVE EDUCATION MODELS IN THE NETHERLANDS

Thomas H. J. Stoeltinga
Chairman, The Netherlands Council
for Higher Professional Education

A form of co-operative education, i.e. practical work as part of professional training, has existed in the Netherlands for over a century. Its origin was the education in companies and organizations in the technical and agricultural sector, which trained their own high-level specialists and staff-members. Originally, this type of education could be considered on-the-job training to which more theory was added in the course of time. Thus, in the past century colleges for professional education were developed in all sectors of society, such as trade and industry, administration, the social-cultural sector, agriculture, banking, and so on.

Typical for this kind of education is the alternation between theoretical training and the acquisition of practical skills through work experience. Compared with the "Sandwich courses" in the United Kingdom and the "Co-op programs" in the United States there are significant differences in design, but there is much resemblance in goals. Co-operative education in the Netherlands is a widespread type of education at the secondary as well as at the higher education levels. I will confine myself to the latter in providing some background information.

Structure of Higher Education

Higher education in the Netherlands is divided into two types. The first type comprises the 13 universities, including the universities of technology, with 130,000 students in all. Here students can choose their special discipline on a high theoretical level and get a traditional academic degree. The second type comprises over 300 colleges for professional education based on different co-op models. At present the higher professional education sector comprises some 140,000 full-time students and about 60,000 part-time students. Higher professional education includes a great variety of colleges and training courses as illustrated in Table I.

There has been a tremendous growth in student numbers during the past ten years, especially in the categories of business administration, health education, and teacher training for secondary education. In addition to this growth, great changes have also taken place in teaching methods. Training programs have been changed from purely professional programs, firmly based on the teaching of practical skills to programs that concentrate on teaching how to apply acquired (scientific) knowledge and on attitude-training.

The need for specific applied research in the various disciplines and also for research in training methods has become apparent. As a result of these developments

Table I

Category	Number of students 1979/1980			Number of colleges
	full-time	part-time	total	
1. Technical education	22,000	3,000	25,000	33
2. Laboratory education	7,000	1,500	8,500	24
3. Nautical colleges	3,600	400	4,000	9
4. Health and medical care	13,500	3,300	16,800	43
5. Agriculture and horticulture	4,500	300	4,800	13
6. Business administration	8,000	300	8,300	16
7. Teacher training for primary education	25,800	10,700	36,500	60
8. Teacher training for secondary education	26,800	19,000	45,800	26
9. Sociocultural colleges	16,000	12,000	28,000	47
10. Art education	11,000	6,000	17,000	42
11. Others	3,500		3,500	12
TOTAL	141,700	56,500	198,200	325

the discrepancy in the level of education between students of the colleges of higher professional education and the students of the traditional universities is decreasing. It has become more common for graduates of the colleges to get positions equivalent to those traditionally reserved for university graduates. Thus, the traditional separation between the two types of higher education is becoming less relevant. The Dutch Government -- in full cooperation with the Council for Higher Professional Education -- is now preparing a new legal structure for the two types of Higher Education on a more integrated model.

General Characteristics of the Programs

Students who seek admission to a college of higher professional education, must have passed secondary school examinations in one of three types of secondary

schools: pre-university schools, general secondary schools, or secondary professional schools. Some 60 to 90% of the students come from general secondary schools (HAVO), from a five-year program of secondary education. The final examination is taken in six elective subjects. Most of the colleges of higher professional education require completion of two or three specific subjects, i.e. a student seeking admission to a college of technology must have studied mathematics, physics and, preferably, also chemistry.

The courses in most of the categories of higher professional education last four years. Although the structure of the programs differs from category to category and also depends on the requirements of the future profession, in the first two years of the program much care is given to basic subjects; to development of practical proficiencies; and to an orientation regarding the particular profession by means of short practical work periods.

In most of the colleges, the third year of the program consists of one or two periods of obligatory work with cooperating employers. A relevant work experience allows the student to truly integrate the practical work with his/her academic studies; the professional training, personal development, and the academic knowledge of the student are all enhanced by the interaction of study and work.

The programs in higher professional education are more or less similar to the "thick sandwich courses" of the polytechnics and some universities and colleges in Great Britain. In some categories there exist also the so-called "thin sandwich" courses. In the fourth year of study the student returns to college to prepare for the final examination. In many cases the student is expected to work independently on a special project resulting in a proposal or a paper, which then forms a substantial part of the final examination. Also on this project the student works together with the cooperating employer.

The diploma awarded by the colleges of professional education allows graduates to enter positions at the executive level in trade and industry, in administration, public health, social services, and in education, as well as work independently as a professional.

The Compulsory Practical Training Period

All of the third-year practical training programs place the training period under the responsibility of the Institute or College and the cooperating employers have to subscribe to their educational goals. In the employing corporation there must be special guidance available for the student during the working period as the student is not formally an employee but still, in the first place, a student who is in a learning environment. The practical period is thus considered an educational tool rather than just a way to get a job to earn a salary. Although not all positions are paid, in some cases (mostly in trade and industry) the student gets a salary and, of course, his/her living expenses are paid.

During the training period, the Institute or College and the employer share the responsibility for the student. A staff-member (mentor/teacher) of the institution visits the student regularly during the training period and consults both with the student and his/her counselor. At the end of the work period, the student is required to write a report which is evaluated and reviewed by the teaching staff and by the counselor(s) of the employer.

This description of the training period pertains to full-time students. The system differs if part-time students are involved, especially in the categories of social work and health-care. Those who apply as part-time students already must possess a relevant work experience. During their study period they are not required to undertake a training period. This type of education is an example of concurrency in that theory and practice influence each other in a permanent and constructive interchange. Thus the duration of the study is shorter for part-time students, but leads to the same diploma.

Problems/Advantages in Practical Training

Co-operative education in the Netherlands as in other countries faces several problems. In the context of this article, I can only touch on a few of them: (1) There is an increasing shortage of staff with adequate work experience to teach the students. (2) In some categories of education there is a shortage of work places which, naturally, is a reflection of various economic pressures in different types of companies. (3) Cuts in expenditures for education effect the time and the financing for development of curricula, evaluation, guidance during the training period, and research for a better relationship between theory and practice. On the whole, however, the advantages of practical training are more important than the disadvantages.

From the students' point of view these advantages are:

- A good linkage between theory and practice. This stimulates insights into the field for which the student is educated.
- An increase of motivation.
- Promotion among students of a sense of responsibility and reality.
- Contact with people from different backgrounds and an appreciation of the significance of cooperation in an early stage of professional development.
- An opportunity to assess which job best suits him/her.

For the employers, the advantages of a practical training period are:

- As a potential employee of the organization the student can familiarize himself/herself at an early stage with the practices and rules of the organization.
- Students frequently contribute new ideas which may prevent myopia within the organization.

- Supervisory staff of the colleges work with many companies that have similar problems and thus might be able to contribute to problem solving within a company.
- Already during the study period the employer is able to assess the student's performance in order to eventually make an offer of employment.

For the educational institution some advantages can also be ascertained:

- Students and staff members are able to use equipment not affordable at the institution.
- Corporations can draw attention to new developments in research and technology which educational institutions can introduce into their curricula.

For more information contact: The Netherlands Council for Professional Education
Postbus 123
2501 CC 's-Gravenhage
The Netherlands

SANDWICH COURSES AT TRENT POLYTECHNIC

Cecil T. Butler
Dean, Office for Overseas Cooperation
Trent Polytechnic
Nottingham, Great Britain

Introduction

It is now twenty years since the first sandwich course was introduced to Nottingham and during this period the concept has spread throughout the Polytechnic and we now have a total of twenty-nine sandwich courses in the Polytechnic operating in fifteen departments. This represents a very significant acceptance of the sandwich principle, not only by us, but by students, industry, and commerce alike; and the fact that we have as many sandwich students as any educational establishment in Britain places some responsibility on us to ensure as far as we are able, that recent criticisms of the sandwich principle either do not apply, or if they do, that we at Trent are rectifying the situation. We believe in the sandwich principle; we believe that it is educationally sound and we freely admit to the difficulties in operating the system. What we have to do is to overcome the difficulties and improve the operation.

So far as the engineering industry is concerned, the Finniston Report commends the principle of sandwich education and has recommended the compulsory inclusion of more practical aspects of engineering application within college programs. With regard to student attitudes, I think it is fair to say that we have found that our sandwich programs recruit strongly and that they are liked by students as well as employers, and indeed sandwich courses in the Polytechnics do represent a growth area at a time of acute economic depression.

The recession through which the country is passing constitutes a major problem for sandwich education at the present time, and it is proving to be extremely difficult to place college-based sandwich students with employers who are at the same time having to make work people redundant. Nevertheless, it is a startling fact that last session, Trent Polytechnic, with more sandwich students than any other institution in the United Kingdom, was able to place all but 0.7% of its sandwich students in satisfactory employment.

Definition

The word "sandwich" has been loosely applied to any scheme of education involving an element of extra-mural (work) experience either before or during the academic course, relevant or irrelevant to it. For example, the 1:3:1 pattern of education is sometimes claimed to be a "sandwich" course. It may be if the industrial extremities are in some way related to the central core, but this would not fall into my definition of a sandwich course. I regard

a sandwich course as one in which relevant industrial* experience forms an integral part of the course and without the satisfactory completion of which the academic qualification is not awarded.

This definition covers all CNAA sandwich courses, whatever their pattern, and all sandwich courses operated under Joint Committee rules. Likewise, it applies to some, though not all, University "sandwich" courses.

Background

The Council for National Academic Awards (CNAA) has, to a large extent, inherited and maintained the enthusiasm of its predecessor, the National Council for Technological Awards (NCTA), for sandwich courses, and in the seven year period from 1968 to 1975 the number of CNAA sandwich courses in science and technology grew from 123 to 199, an increase of 62%; while in arts and social studies the increase was 126%, from 23 to 52. In the same period there was a more than corresponding increase in the number of students enrolled in those courses. This very significant increase, in addition to the contribution from the Universities, was absorbed by industry, often by breaking new ground and involving smaller companies which hitherto had not participated to any great extent in training programs of any kind. The Technologist Training groups, initiated and subsequently abandoned by Brunel University, and of which Trent's is an outstanding example, illustrate the point. In the last few years, however, it has become increasingly difficult to obtain suitable industrial placements for sandwich students and it is not surprising, therefore, to hear voices raised here and there proclaiming a kind of Aesop "sour grape" philosophy and suggesting that sandwich courses "are not all that sweet anyway!"

What, then, is the basis for such misgivings? The answer is, simply "integration". Do sandwich courses give "an integrated education?" It has been stated in the past that one of the great advantages of the sandwich course over other forms is that the academic work is, or can be, integrated with appropriate industrial experience and that the two elements of the sandwich progress can develop simultaneously, each contributing to a fuller understanding of the relevance of the other.

The principal justification, then, of a sandwich course is that it links in a progressive and ordered way the understanding of the principles (academic) and practice (industrial) of a profession or discipline. Law is practiced in the courts, commerce takes place in the markets and engineering in factories. It is to these that the student must go to learn his profession. We in academia help to provide the necessary intellectual equipment, the education of the mind, grounding in

* In this paper, the word "industrial" is taken to include all forms of relevant extra-mural experience, eg. commercial, legal, para-medical, etc.

the relevant principles and, hopefully, an understanding of the relationship of the profession to society at large. But the profession is practiced elsewhere. And just as in physical growth, food is best assimilated at regular intervals in the total spectrum of activity so it is with the learning process. And in any case, in the vocational or "applied" fields the academic course can only be understood when viewed against the background of industry, commerce, or the profession; and even this cannot adequately be experienced all at once.

The sandwich course is of value to the student, to the employer and to the Polytechnic. The value to the student stems from the meaning given to his studies. Principles taught in the classroom are reinforced and given concrete application on industrial assignments and students are able to see the relevance of their studies, so increasing motivation. On occasion, students gain in confidence as the result of a successfully completed work assignment with profitable feedback to their academic studies from enhanced reliance on their own judgement. There are several other profitable by-products, such as a clearer picture of career prospects, a better understanding of the world of work as a "socio-economic system", a widening of horizons and adjustment of social attitudes resulting in a degree of maturity not solely the result of the passage of time, but due in part to the excursion into a largely adult environment.

Employers have for some time seen the benefits to them of sandwich education. They find sandwich students enthusiastic workers and eager to learn, as well as providing a pool of talent from which to recruit personnel, which is of particular value when order-books fluctuate. Industry-based sandwich students enjoy a confidence from the sense of "belonging" to an industrial or commercial enterprise and the firm is able to inculcate a sense of loyalty from the beginning as well as training in the company's methods and attitudes. The close liaison that exists between an employer and the Polytechnic arising from the partnership in education gives rise to other forms of cooperation profitable to both.

There are benefits, too, to the Polytechnic. Many of the more discerning young people in the schools are attracted to the idea of a course that mixes academic study with work experience, not only for the financial advantages which this gives; and a college that can offer to place its sandwich students in suitable industrial environments will attract the more able students to its ranks. More importantly, however, is the feedback into the educational process that the work brings. Students bring back to the Polytechnic up-to-date information on industrial and business practices and new technology, while the regular visits of tutors to these same students while in industry compels an involvement of the teaching staff with the profession at large. You cannot run a sandwich course from an ivory tower.

The foregoing principles are but a summary of some of the advantages of the sandwich system. These have been accepted for so long that operators of sandwich courses tend to regard them almost as axiomatic. The CNAA inherited from the NCTA an attitude towards sandwich courses which it not only fully

accepted but extended from the realm of technology into that of the arts and social studies with a subsequent gain of new sandwich programs.

Practical Principles for Operation of the Sandwich Course

The following are some important areas of responsibility for the running of a sandwich program:

1. The Student

The student must cooperate fully in the placement process, and may during the initial admission procedure, be required himself/herself to write letters of application, etc. If he/she is unable to secure an approved assignment, the student must accept one found by the Polytechnic. The student must also accept advice concerning industrial interviews, etc. and not hamper efforts of placement by adopting inappropriate attitudes.

2. The Department

The Head of the Department must accept responsibility for the placement of sandwich students and for the regular supervision and assessment of the industrial experience. In practice, of course, authority is delegated to the professional training tutor(s).

3. The Dean of the School

Deans of the School should satisfy themselves that all students whom they admit to sandwich courses in their School have a reasonable prospect of obtaining the necessary industrial training when the time arrives. The Polytechnic must accept responsibility for the placement of students once they are admitted to the course.

4. Central Administration

The institution also needs to consider what central support services, if any, are needed to facilitate sandwich placement. Brunel University, for instance, operates an Institute of Industrial Training of which the Placement Service is one wing and the Careers Advisory Service another and separate wing. Sheffield Polytechnic likewise operates a central support service under the auspices of their Student Services Center.

5. Industry Support

There is a need for each institution to establish an ad-hoc working party of selected individuals from industry and the Polytechnic to consider and report on the present and future operation of sandwich courses and thereby to maintain full input from both employers and educators.

Conclusion

I believe that it is likely that the principle of sandwich education will increase, in the U.K., particularly in technological programs since any increase in the

duration of such programs will almost inevitably involve a period of practical work assignment.

I also believe that we will continue to have a measure of success in the placement of students for overseas work. An example of this development is the longstanding working relationship in the mutual placement of sandwich (or co-op) students for suitable work experience between Northeastern University and Trent Polytechnic.

CO-OPERATIVE EDUCATION IN THE UNITED STATES

James W. Wilson

The Asa S. Knowles Professor of Co-operative Education
Co-operative Education Research Center
Northeastern University
Boston

Co-operative education began in the United States in the School of Engineering of the University of Cincinnati in 1906. Three years later, the second program was begun at Northeastern University. It is not known but suspected that the vehicle for transmitting the plan from Ohio to Massachusetts was the Y.M.C.A.: Northeastern was a Y.M.C.A. college and there was and is today a Y.M.C.A. Branch on the Campus of the University of Cincinnati. By 1921, ten institutions in the country had adopted the co-operative plan. These early programs established the dominant pattern of co-operative education for many years. They all used the scheme of alternating patterns of full-time on-campus study, and full-time off-campus work; they all required students to participate; they all added a year to the undergraduate program; and they all insisted that the co-operative jobs be directly related to the students' academic program and that all co-operative work assignments would be paid jobs.

During the next forty years about 40 new programs emerged, demonstrating again that innovation in higher education is adopted slowly. It has been said that it takes about 50 years for higher education to accept a new idea. This was certainly the case with co-operative education. 1957 marked the beginning of co-op's national acceptance as a valuable education strategy and of the great expansion which was to occur. A conference in Dayton, Ohio brought employers and educators together to discuss the possibility of co-operative education providing some solution to the emerging problem of the large numbers of World War II babies that were now reaching college age. The thought was that if colleges and universities would organize their programs on a co-operative basis, they could accommodate perhaps as many as 75 to 80 percent more students with existing facilities. Although subsequent events were to show that co-op would only rarely be adopted for this purpose, the conference was of great importance because it led to a two-year national assessment of the educational merits of co-operative education. This study demonstrated clearly the values of co-operative education to students, employers and educational institutions and led to the formation of a specialized educational agency, The National Commission for Cooperative Education. The N.C.C.E. sought to interest institutions throughout the country in adopting co-operative education. The efforts of the Commission, combined with institutional efforts to reform because of pressures to develop more relevant education, in the 1960s generated considerable interest in co-operative education as a possible alternative approach to education throughout the country. Ultimately, the federal government became interested and intervened to support projects to plan, implement, expand, and strengthen programs of co-operative education. In

consequence, the 1970s witnessed a very rapid expansion of co-operative education. In 1968 there were approximately 125 co-operative education programs; today there are nearly 1100.

The rapid expansion of co-operative education during the past decade was accompanied by significant changes in the predominant patterns of program organization and operation. First, the 1970s were a period of expansion for community colleges and a very large number of these new institutions started co-op programs. In 1970, community college programs accounted for less than 20 percent of all programs; today, they account for 46 percent. Second, prior to the rapid expansion virtually all programs were in technical and professional curricula. During this period of program expansion there has been a significant growth of co-op within the liberal arts disciplines. Third, whereas early programs typically required an additional year for completion, and most institutions generally required participation for graduation and almost always were organized on an alternating pattern of full-time work and full-time study, most of today's programs do not require additional time for graduation, are optional, and make use of a variety of patterns of work and study. Finally, in 1970, approximately 20 percent of all co-op programs awarded credit based upon co-operative work experience. Today over 70 percent of the programs substitute credits earned through co-operative education for those earned by traditional classroom attendance.

Throughout the history of co-operative education in the United States, Northeastern University has played a leadership role. It was the first institution that tied itself totally to the concept of co-operative education and to establish a policy that all of its educational programs would operate on the co-op plan. Acting upon this policy, Northeastern became the first institution to provide co-operative work experience in such diverse fields as Nursing, Education, Pharmacy, and Law. Northeastern has provided leadership in other ways as well. It was the first institution in the country to provide training programs for co-operative education personnel, which it began in 1966. It continues today to provide national leadership in co-op training. Northeastern established the only endowed professorship in co-operative education in 1968 and operates the only Co-operative Education Research Center. Finally, the University has pioneered with international co-operative education, both in placing N.U. students in work situations in other countries and in bringing students from other countries to the campus and placing them in co-operative assignments here.

The rapid expansion of co-op programs has slackened and it now appears that we have entered a period to strengthen existing programs. Specifically, programs are seeking to increase student and employer participation and to assure that co-op work is an integral part of students' total learning experience.

THE MANAGEMENT INTERN EXPERIENCE

Robert P. Black
M.B.A. 1981

As part of the M.B.A. Management Intern Program, I spent six months working for the Burroughs Corporation as a Management Systems Analyst in Detroit. I had chosen Northeastern's Intern program over the regular full-time program because I lacked substantial real-life experience in the business world. The 21-month degree program at Northeastern was comparable in length and reputation to that of other schools, but was, to the best of my knowledge, the only one in the Northeast with a work period built in.

The internship was definitely a worthwhile learning experience. I used two computer languages and two control languages, and frequently dealt with users on a one-to-one or small-group basis, in maintaining and updating the Capital Projects and Capital Assets control systems. Working with other analysts on the problems of system and data interfaces was also an important part of my job.

In addition to reinforcing my desire to go into the field of information management, the job also gave me first-hand exposure to the political, personality, and communication problems inherent in any office environment. I was not an outside observer of these issues, but was instead directly involved with them. Another aspect of the learning process was that my wife and I realized the importance of location and its effect on both our personal lives, our work performance and attitudes.

Being in a position of responsibility, and having people value what I had to say, were two things I had not experienced prior to my internship. The experience at Burroughs increased my self confidence in dealing with people and in work-related problem solving. It also allowed me to more narrowly focus the remainder of my education upon returning to Northeastern.

In short, my co-op experience accomplished almost all I had hoped it would. I had gained relevant work experience, my cash flow was temporarily improved, my career direction was reinforced, and my confidence in my ability to function successfully in a competitive business environment was greatly improved. In looking back, I would say it was an invaluable plus in my business education.

THE "NORTHEASTERN IN ENGLAND" PROGRAM

Nancy Egan
B.A., Education 1981

Under a special work/study program in cooperation with Trent Polytechnic, Nottingham, I spent nine months in England attending the institution for three months and working six months in a home for mentally handicapped children in Cuckfield, a small village south of London. This type of program allowed me the best of two worlds: I was able to live with an English family and, thus, learn about British family life as well as being able to interact with English students in the Polytechnic and learn about higher education. I was particularly struck by the competition a British student goes through in order to be accepted at college and came to learn that attending college in England is quite an honor.

Although living with a family was very enjoyable and enabled me to realize great savings I did miss living on campus and interacting closely with the British students. As a simple remedy to this situation, I joined a hiking club which allowed me not only to meet other students, but also to see much of the British countryside.

The children's home in which I worked for six months was under the Community Service Volunteers Program (CSV), an educational charity which involves young people in full-time community service throughout Great Britain. Workers are considered "volunteers" in that they do not receive wages although free accommodation, meals, and a small stipend are provided. I was responsible for twelve children, teaching them survival skills, helping them establish interpersonal relationships and supervising and planning shopping and other neighborhood activities. This job placement had much to offer since I was considering becoming a teacher of the handicapped.

I feel that International Co-op is one of the best programs offered at Northeastern. Living and working in a foreign country is an experience not to be missed. My time in England encouraged me to look at my life from a different perspective and helped me establish some long-range goals. I also developed much more self confidence. After living in a foreign culture for nine months I also gained a broader vision of the world and realized how much we generally take for granted in our lives.

An additional benefit was that the program was affordable. The tuition at Trent was the same as at Northeastern and my main out-of-pocket expense was the overseas travel fare which was made possible through Freddie Laker's stand-by low cost air fares.

ENGINEERING EXPERIENCE IN WALES

Rick Wade
B.Sc., Civil Engineering 1981

Prior to my six-month cooperative work assignment in Great Britain, I had completed three full years at Northeastern University: two years undergoing classroom instruction and one year working as a co-op student. My new assignment as an international exchange student was as an assistant engineer for the Wrexham and East Denbighshire Water Company, located in Wrexham, North Wales. The Water Company employs over one hundred individuals and is one of the few private water supply/distribution companies to remain in Great Britain after nationalization of the industry in 1976.

As an engineer in the new works engineering department I was responsible for assisting my colleagues on many projects. I was involved with several field surveys; I updated record drawings and I performed cost estimates. Much of my time was spent in field supervision of construction projects and as time progressed I was given more responsibility, and eventually managed several smaller projects on my own.

The experience that I gained through participation in the International Co-op program is not easily summed up, though the benefits are numerous. By observing and assisting my British counterparts I was able to gain a better understanding of their problem solving techniques and management principles. I was most impressed by the cooperative attitude exhibited by all of the company's employees. They genuinely appeared more concerned in showing me the many features of their company, rather than making sure they obtained their worth from me as an employee. This generous attitude afforded me the opportunity to observe, in depth, their diverse system from a professional and social point of view.

Also of great significance during my stay was the cultural education I received. Living, working, and travelling within the U.K. gave me an understanding of the British that no text could offer.

As I look back at my six-month stay in Wales, I begin to truly appreciate what the adventure provided. Personally, it gave me the satisfaction of being in a different cultural environment and allowed me to form lasting friendships in the process. Professionally, it helped me grow as an engineer and has since assisted me in seeking post-graduate employment.

I sincerely believe that my co-op in Great Britain has been one of the most valuable educational experiences in my undergraduate career and I highly recommend anyone who has the opportunity to partake in International Co-op to do so.

AN EMPLOYER'S VIEW OF CO-OP

From an Interview with Mr. Ray Buxton
Director of Human Resource Management
Department of Transportation, Boston

The Department of Transportation has collaborated with Northeastern University's Co-operative Education program since 1970 but, in addition, also employs co-operative education students from other institutions throughout the U.S., such as Alabama Agricultural and Mechanical University and Massachusetts Institute of Technology. Since 1970, the Department thus has employed some 200-250 students in co-operative work assignments at a rate of 10-15 a year. The commitment of the Department to the idea of co-op is evidenced by the fact, that the Human Resource Department has assigned the liaison activities with the co-op institutions to a special co-op coordinator. Although co-op is not the coordinator's sole responsibility, continuity in the position assists in a smooth running of the co-op functions.

The Department is research and development oriented and the majority of students hired are in engineering and sciences, although some also have been hired in the management area. The Department is a public agency and transportation is a competitive area. Since it is able to employ some of the brightest and most innovative co-op students, there is much competition from private industry to hire the co-op students on graduation and Mr. Buxton estimates that the Department is able to recruit some 10% of the co-op students for permanent employment.

Mr. Buxton considers the co-op experience one of mutual advantage for the students and the company. Students enter the Department while still in their formative stages and learn the techniques and applications they will need and the practical issues and problems that they will face in a job situation on graduation. At the same time, they are able to assess whether the career for which they are training truly is the one they prefer, and changes of academic major often take place after a co-op assignment which has been able to focus the student's interest in a particular direction.

The Department generally finds that the trainees coming from the co-op ranks are better prepared and motivated than those from traditional institutions and considers co-op an important source of its new manpower. In all, the Department has been very well satisfied with its co-operative education students.

CO-OPERATIVE EDUCATION SERVICES AT NORTHEASTERN

Northeastern University can draw upon over seventy years of experience in finding practical solutions to many of the problems common to co-operative education programs. During these years, eight undergraduate colleges and several of the graduate schools have been organized with off-campus work experience as an integral part of the educational process. This growth could not have taken place without a university-wide commitment to the philosophy of co-operative education. This commitment is illustrated by the diverse but related activities of the five departments within the Division of Co-operative Education:

Department of Co-operative Education
Center for Co-operative Education
Co-operative Education Research Center
Center for Secondary School Work Experience Education
Department of Career Development and Placement

1. The Department of Co-operative Education is the largest of the five departments and is responsible for the administration of the undergraduate and graduate co-operative education programs. This year the University's co-operative education faculty will effect 14,500 co-op placements, representing more than 60 different majors, with 2,500 employers throughout the United States, Canada, Europe, Israel, and South America.

Through its International Co-operative Program the Department also offers undergraduate and graduate students an opportunity to work abroad. The University maintains an active foreign placement program for students whose linguistic, academic, and professional background makes them competent candidates for positions abroad. (The International Co-operative Program is described on page 52.)

The Life-Career Planning program is also run by the Department of Co-operative Education. This program focuses on skills identification, career planning and exploration, career goals and values clarification, as well as job seeking techniques directly related to specific fields of study.

For information contact: Roy L. Wooldridge, Vice President of Co-Operative Education
Paul M. Pratt, Dean of Co-operative Education

2. The Center for Co-operative Education runs year-round training programs for administrators, educators, and employers preparing to enter into co-operative education programs. Since 1966 the Center has served over 3,500 persons from 800 institutions not only in the United States and Canada, but also in Australia, Brazil, France, Great Britain, Ireland, Nigeria, Mexico, and Taiwan. In addition

to regular on-going Boston-based training programs, mobile training workshops are conducted. Program evaluations and extensive consulting services also are available.

For information contact: Paul Dubé, Director

3. The Co-operative Education Research Center undertakes research on the effectiveness of co-operative education. The purpose of the studies is to aid practitioners in the field so that they can be of greater service to students enrolled in co-operative education as well as to co-op employers. As part of its research activity, the Center has established an Information Clearinghouse to collect and disseminate information about co-operative education. A library also is maintained by the Center for research and consulting purposes.

For information contact: James W. Wilson, Director

4. The Center for Secondary School Work Experience Education offers a full complement of consulting, training, and research services to secondary schools, community groups, and employers interested in implementing or expanding work experiences at the secondary level.

For information contact: Ellen N. Winer, Director

5. The Department of Career Development and Placement provides services to all students and alumni of the University by offering career guidance, counseling, and job placement assistance; maintaining reference files of job opportunities, and arranging contacts with potential employers. In addition, the Department assists undergraduate students seeking admission to graduate study in professional schools and arranges part-time internships for both undergraduate and graduate students. The department also provides regularly scheduled workshops and seminars for students and alumni on career development, job finding techniques, résumé writing, and effective interviewing. The Department has established an International Placement Service for foreign students at Northeastern seeking opportunities for training between graduation and their return home, as well as to foreign students exploring job prospects with multinational corporations with branches in their home country.

For information contact: Sidney Austin, Director

MECHANICS OF CO-OPERATIVE EDUCATION

Philosophy of Co-operative Education

The major concern of co-operative education is career development as an integral part of the educational progress. Therefore, the co-operative program is based on paid employment in practical, curriculum-related jobs structured to meet the interests, abilities, and aptitudes of the students. An effort is made to place professionally oriented students on a sequence of assignments with increasing responsibility, often with one employer. Through a series of assignments the students thus receive progressive experience, enabling them to become increasingly proficient in the intended career.

Students who do not have a clear career objective may be placed in a series of different job assignments designed to allow a broad orientation to the world of work. Resulting job placements generally will not provide increasing responsibility as each will be a beginning experience.

Structure of Operation

During the first year on campus all students participate in an orientation program to acquaint them with the program and to inform them about their responsibilities and the responsibilities of the university. Following group orientation meetings, each student is scheduled for at least one individual interview with a co-op coordinator or a coordinator's assistant. The student's abilities, interests, and aptitudes are explored and as a result both the coordinator and the student will be able to focus on the type of co-operative assignment best suited to the student's needs.

Northeastern offers five-year curricula instead of the usual four-year program leading to a bachelor's degree. After a freshman year of full-time study, participating students are assigned to either Division "A" or Division "B". During the four upper-class years, Division "A" and Division "B" students work alternating quarters providing year-round coverage of co-operative education assignments. When the students in one group are at work, the students in the other group are engaged in full-time study at the University.

The calendar in Table I shows the alternating pattern. Division "A" students work during the weeks circled on the calendar, and Division "B" students work during the weeks not circled. Prior to the job placement each student signs an agreement indicating that he/she understands the policies of the Department of Co-operative Education and is willing to abide by them. A second section of the agreement refers to the specific job situation and outlines its specific details.

Following the completion of each co-operative period and upon their return to school, all students are interviewed at least once during each school period

by their coordinator. During these interviews, counseling is given to assist the student in achieving the maximum educational benefit from the co-operative education program. The coordinator also will discuss the employer's evaluation of the student.

Although academic credit is not given for co-operative work, satisfactory performance on the job is considered a requirement for the degree. Every co-operative work period must be completed to the satisfaction of the Department of Co-operative Education. All co-operative education students also must maintain a determined level of scholarship to remain in the program.

NORTHEASTERN UNIVERSITY'S COOPERATIVE EDUCATION CALENDAR

NORTHEASTERN UNIVERSITY 1983-84

SEPTEMBER 1983											
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INTERNATIONAL CO-OPERATIVE EDUCATION AT NORTHEASTERN

Mary Lynn Rector
Program Officer
International Co-operative Education
Northeastern University
Boston

International Co-op is a special program set up within Northeastern's Co-operative Education Department to develop the many links which Northeastern maintains with foreign institutions, governments, and multinational corporations.

Purpose and Objectives: The purpose of the program is to provide work exchanges overseas in response to interest from American students in living and working abroad and to interest international students, both at Northeastern and abroad, in the Co-operative Education program. In addition to the placement activities, the program promotes the co-operative education system through daily contact with institutions overseas and in the U.S., and through conferences, workshops, and distribution of printed materials.

In seeking student placements, the goal of International Co-operative Education is to provide a paid work experience in a foreign country for an extended period of time, at a job which is closely related to a student's major or career interests. This involves:

- arranging jobs for American students interested in working overseas;
- operating an Exchange Co-op Program for students from abroad wishing to gain work experience in the United States;
- assisting International students enrolled at Northeastern with Co-op placements in the United States, and in their native countries;
- developing and coordinating work/study abroad combinations for students who wish to study for one or two quarters at a foreign institution prior to Co-op placement;
- advising students on study abroad opportunities, usually in conjunction with a Co-op placement.

Placements: The majority of positions are in professional areas such as business administration, engineering, computer science, social services, and health-related areas such as medical technology and nursing. In Arts and Sciences, the majors most represented are sociology, psychology, human services, biology, economics, public administration, and modern languages.

Last year International Co-op placed sixty-three students from Northeastern and other universities in jobs in twelve countries: Canada, Colombia, France, Germany, Great Britain, the Irish Republic, Israel, Lebanon, Nigeria, Panama, Sweden, and Venezuela. Typical jobs were: credit analyst, Dublin; marketing

research, London; psychiatric nurse, Oxford; social worker, Glasgow; structural engineer, Israel; medical technologist, Sweden; teaching ESL, France; electrical engineer, Germany. In the Co-op Exchange Program, International Co-op brought in forty-four students and trainees from Canada and Western Europe to work primarily in engineering, business, and medically related jobs in the United States.

Institutional Links: Through International Co-op Programs, agreements have been formed between Northeastern and the following institutions for Co-op and Co-op/Study Exchanges: University of Waterloo, Canada; Ulster Polytechnic, N. Ireland; N.I.H.E., Republic of Ireland; City University, London; Manchester Business School, Brunel University, Trent Polytechnic, Sheffield Polytechnic, Middlesex Polytechnic, Polytechnic of Wales, the Chelmer Institute, United Kingdom; Ecole Supérieure de Commerce, Ecole Supérieure de Physique et de Chimie Industrielles, Ecole Supérieure d'Ingénieurs Electro-Technique et Electronique, Institut Européen des Affaires, Paris; Zentralstelle für Arbeitsvermittlung, Germany; Centro Colombo Americano, Colombia. Agreements are currently being negotiated with other institutions in Germany, Sweden, the Netherlands, the United Kingdom and Brazil.

Future Development: In conjunction with the Irish Studies Committee, International Co-op is developing an option for students to study Irish history and culture at Northeastern prior to Co-op placement in Ireland, and in some cases to study in Ireland in combination with Co-op.

International Co-op is working closely with the Modern Languages Department to encourage the development of more language courses for students in professional areas such as business, engineering, and nursing to prepare more students for Co-op in non-English speaking countries.

International Co-op is attempting to develop more Co-op positions in their home countries for international students enrolled at Northeastern. This will involve working with Northeastern's foreign alumni and multinational corporations interested in recruiting foreign nationals.

DIRECTORY OF ASSOCIATIONS AND ORGANIZATIONS
ACTIVE IN CO-OPERATIVE EDUCATION

Ida Cambria

1. Association for Innovation in Higher Education

c/o Dr. James van Ness
Central Wyoming College
Riverton, Wyoming 82501

An organization that promotes experiential, midwinter terms for colleges using the four-one-four system (in which the fall and spring semesters are separated by a four-to-six-week midwinter term, generally reserved for self-directed study or field experience).

2. Association for International Practical Training, Inc. (AIPT)

217 American City Building
Columbia, Maryland 21044

AIPT is the American affiliate of the International Association for the Exchange of Students for Technical Experience (IAESTE).

3. Association for Sandwich Education and Training

Student Services
Sheffield City Polytechnic
Pond Street
Sheffield S1 1WB
Great Britain

Founded in 1979, the Association is composed of the members of the UCISC and the Polytechnics Committee on Sandwich Courses as well as employing organizations.

4. Association Internationale des Etudiants en Sciences Economiques et Commerciales (AIESEC)

c/o Richard Cachia-Caruna
45 av. Legrand
B-1050 Brussels
Belgium

Founded in 1948, it now serves 58 countries in the world by placing students in the field of international management education. An entirely student-run organization.

AIESEC for the past 30 years has provided meaningful work experiences for some 90,000 students.

5. Carl Duisberg Gesellschaft (CDG)

Hohenstaufenring 30-32
Postfach 190128
D-5000 Köln 1
Federal Republic of Germany

Carl Duisberg Society (CDS)
425 Park Avenue
New York, New York 10022

A private organization with individual members, partially financed by voluntary contributions. Organizes practical training for junior personnel from Germany in other countries and places foreign personnel in work situations in Germany. Implements refresher training for specialists (12-18 months) in Germany under the auspices of UNIDO, OECD, and UNESCO. Has arranged some 120,000 placements of different types to date and is thus one of the largest exchange programs.

6. Cooperative Education Association (CEA)

E. R. Pettebone, Secretary
247 Alumni Center
Indiana State University
Terre Haute, Indiana 47809

A national professional society established in 1964 to promote co-operative education and to link employers and educators in furthering work opportunities for students. It publishes the Journal of Cooperative Education, a periodical publication on various topics of interest in experiential education.

7. Cooperative Education Division (CED) of the American Society for Engineering Education

1 Dupont Circle
Suite 400
Washington, D.C. 20036

Serves the needs of co-operative education in engineering.

8. Council on International Educational Exchange (CIEE)

205 East 42nd Street
New York, New York 10017

A non-profit organization serving student travelers since 1947. Headquartered in New York with other offices in San Jose, Los Angeles, Tokyo, and Paris and a membership of 184 North American colleges, universities and youth-serving agencies that sponsor educational exchange programs. The Council's Cooperative Study Centers provide overseas study opportunities for students at both the undergraduate and graduate levels. Foreign language programs are offered in France and Spain, a film studies program in Paris, and an intensive Russian language study center at Leningrad State University. CIEE's employment programs assist American college students in locating temporary jobs in Britain, France and Germany. Similar opportunities are made available through the Exchange Visitor Program to foreign students who wish to obtain temporary employment in the U.S.

9. Experiential Education Project sponsored by the
National Institute of Social Sciences (NISS)

NISS
150 Amsterdam Avenue
New York, New York 10023

A national organization engaged in research and impact studies of experiential education. It focuses on assessing the impact of experiential education on traditional college students and developing means by which experiential education can be made available to students in universities where programs do not exist.

10. Institute for Off-Campus Experience and Cooperative Education

Susan Stroud, Director
College Venture Program
Box 1838
Brown University
Providence, Rhode Island 02912

Created in 1972, its purpose is to counsel and find relevant work assignments for students at institutions which do not operate co-operative programs themselves.

11. The International Association for the Exchange of Students
for Technical Experience (IAESTE)

Mr. George Anemoyannis, General Secretary
P.O. Box 3414
Kolonaki Post Office
Athens, Greece

IAESTE is an international educational exchange organization with National Committees in 48 countries and "Cooperating Institutions" in three additional countries. The student exchange program includes college and university students of engineering, architecture, agriculture, mathematics, and the sciences with some 175 major fields of study. Trainees are typically placed for 8-12 weeks of on-the-job training, usually during the summer months. Longer placements of up to one year and for non-summer periods are also possible, if desired by the employer.

12. National Center for Public Service Internships

Richard A. Ungerer, Director
1735 I Street, N.W.
Suite 601
Washington, D.C. 20006

An organization engaged in developing internships with public agencies and providing program and agency information on internship placements.

13. National Center for Service-Learning

Lyn Baird, Director
806 CT Avenue, N.W.
Washington, D.C. 20525

An organization that encourages service-learning among college students, provides free program consulting services to colleges and universities, and publishes Synergist, a periodical publication on service-learning.

14. National Commission for Cooperative Education

Roy Wooldridge, President
Northeastern University
360 Huntington Avenue
Boston, MA 02115

A non-profit agency, composed of leading educators, industrialists, and businessmen, created in 1962 to acquaint colleges and universities with co-operative education and to provide assistance in initiating programs.

15. Society for Field Experience Education
(National Society for Internships and Experimental Education)

Richard A. Ungerer, Executive Director
1735 I Street, N.W.
Suite 601
Washington, D.C. 20002

A nonspecialized organization that serves the general needs of those engaged in all kinds of experiential education programs.

16. The Universities Committee on Integrated Sandwich Courses (UCISC)

Institute of Industrial Training
Brunel University
Uxbridge
Middlesex, UB8 3PH
Great Britain

A committee composed of the nine technological universities which offer sandwich programs.

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